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PATENT ABSTRACTS OF JAPAN

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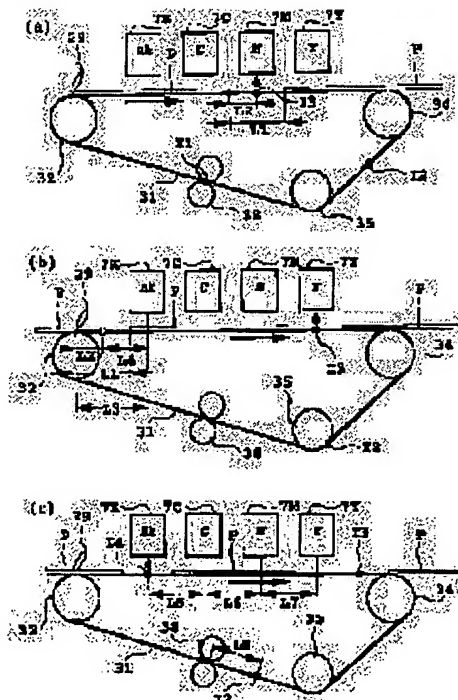
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(54) INK JET RECORDER AND EJECTION RECOVERY METHOD THEREFOR

(57)Abstract:

PROBLEM TO BE SOLVED: To provide an ink jet recorder and an ejection recovery method therefor capable of achieving high speed recording without spending the time for preliminary ejection by a constitution wherein a position for the preliminary ejection on a conveying body such as a conveyer belt can be changed.

SOLUTION: Preliminary ejection regions 11, 12, 13, 14 on a conveyer belt 31 can be changed corresponding to a loaded position of a recording paper P on the conveyer belt 31. Ink is preliminarily ejected from recording heads 7K, 7C, 7M, 7Y on the preliminary ejection regions 11, 12, 13, 14. The ink preliminarily ejected on the conveyer belt 31 is removed by a pair of cleaning rollers 38.



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CLAIMS

[Claim(s)]

[Claim 1] It is the ink jet recording device which can recover discharging performance of said recording head by carrying out the reserve regurgitation of the ink which records an image on a record medium-ed conveyed while it had been laid in a conveyance object characterized by providing the following using a recording head in which the regurgitation [ink] is possible, and is not contributed to record of an image from said recording head. A setting-out means which carries out adjustable setting out of the reserve regurgitation location which avoided said record medium-ed on said conveyance object according to an installation location of said record medium-ed on said conveyance object. A control means to which said reserve regurgitation location is made to carry out the reserve regurgitation of the ink from said recording head. A cleaning means to remove ink breathed out by said reserve regurgitation location.

[Claim 2] It is the ink jet recording device according to claim 1 which is equipped with a management tool which manages said reserve regurgitation location set up by said setting-out means, and is characterized by said cleaning means removing ink breathed out by said reserve regurgitation location based on management information of said management tool.

[Claim 3] Said setting-out means is an ink jet recording device according to claim 1 or 2 characterized by setting up said reserve regurgitation location between said record media-ed located before and behind the conveyance direction on said conveyance object.

[Claim 4] Said setting-out means is an ink jet recording device given in either of claims 1-3 characterized by setting up said reserve regurgitation location whenever said record medium-ed is supplied on said conveyance object.

[Claim 5] Said setting-out means is an ink jet recording device given in either of claims 1-3 characterized by setting up said reserve regurgitation location according to magnitude of said record medium-ed before said record medium-ed is supplied on said conveyance object.

[Claim 6] Said setting-out means is an ink jet recording device given in either of claims 1-5 characterized by fixed setting out being possible so that said reserve regurgitation location once setting up may not be changed.

[Claim 7] Said setting-out means is an ink jet recording device given in either of claims 1-6 characterized by amending said reserve regurgitation location according to a gestalt of said reserve regurgitation.

[Claim 8] Said setting-out means is an ink jet recording device according to claim 7 characterized by amending said reserve regurgitation location according to either [at least] a count of the regurgitation of ink in said reserve regurgitation, or the regurgitation patterns of ink.

[Claim 9] An ink jet recording device given in either of claims 1-8 characterized by having a supply means to supply said record medium-ed to a location on said conveyance object which avoided this reserve regurgitation location, based on said reserve regurgitation location set up by said setting-out means.

[Claim 10] Said setting-out means is an ink jet recording device given in either of claims 1-9 characterized by a multi-statement being possible in said reserve regurgitation location on said conveyance object.

[Claim 11] Said cleaning means is an ink jet recording device given in either of claims 1-10 characterized by clearance of ink of said reserve regurgitation location being possible during record actuation of an image by said recording head.

[Claim 12] Said cleaning means is an ink jet recording device given in either of claims 1-10 characterized by clearance of ink of said reserve regurgitation location being possible after record actuation termination of an image by said recording head.

[Claim 13] An ink jet recording device given in either of claims 1-12 characterized by having a means to make said record medium-ed adsorb, on said conveyance object.

[Claim 14] Said conveyance object is an ink jet recording device given in either of claims 1-13 characterized by being the conveyance belt which carries out circulation migration.

[Claim 15] It is an ink jet recording device given in either of claims 1-14 characterized by for said recording heads being

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two or more recording heads in which the regurgitation [ink which shifts in the conveyance direction of said record medium-ed, and locates and is different] is possible, and said control means making said reserve regurgitation location carry out the reserve regurgitation of the ink one by one from said two or more recording heads according to a conveyance location of said record medium-ed.

[Claim 16] Said recording head is an ink jet recording device given in either of claims 1-15 characterized by having an electric thermal-conversion object which generates heat energy as energy for making ink breathe out.

[Claim 17] By carrying out the reserve regurgitation of the ink which records an image on a record medium-ed conveyed while it had been laid in a conveyance object using a recording head in which the regurgitation [ink] is possible, and is not contributed to record of an image from said recording head In the regurgitation method of recovery of an ink jet recording device which can recover discharging performance of said recording head It responds to an installation location of said record medium-ed on said conveyance object. On said conveyance object The regurgitation method of recovery of an ink jet recording device characterized by removing ink breathed out by said reserve regurgitation location after carrying out adjustable setting out of the reserve regurgitation location which avoided said record medium-ed and making said reserve regurgitation location carry out the reserve regurgitation of the ink from said recording head.

[Claim 18] The regurgitation method of recovery of an ink jet recording device according to claim 17 characterized by removing ink breathed out by said reserve regurgitation location based on management information of said management tool using a management tool which manages said set-up reserve regurgitation location.

[Claim 19] Said reserve regurgitation location is the regurgitation method of recovery of an ink jet recording device according to claim 17 or 18 characterized by setting up between said record media-ed located before and behind the conveyance direction on said conveyance object.

[Claim 20] Said reserve regurgitation location is the regurgitation method of recovery of an ink jet recording device given in either of claims 17-19 characterized by setting up whenever said record medium-ed is supplied on said conveyance object.

[Claim 21] Said reserve regurgitation location is the regurgitation method of recovery of an ink jet recording device given in either of claims 17-19 characterized by setting up according to magnitude of said record medium-ed before said record medium-ed is supplied on said conveyance object.

[Claim 22] Said reserve regurgitation location is the regurgitation method of recovery of an ink jet recording device given in either of claims 17-21 characterized by fixed setting out being possible so that it may not change once setting up.

[Claim 23] The regurgitation method of recovery of an ink jet recording device given in either of claims 17-22 characterized by amending said reserve regurgitation location according to a gestalt of said reserve regurgitation.

[Claim 24] The regurgitation method of recovery of an ink jet recording device according to claim 23 characterized by amending said reserve regurgitation location according to either [at least] a count of the regurgitation of ink in said reserve regurgitation, or the regurgitation patterns of ink.

[Claim 25] The regurgitation method of recovery of an ink jet recording device given in either of claims 17-24 characterized by supplying said record medium-ed to a location on said conveyance object which avoided this reserve regurgitation location based on said set-up reserve regurgitation location.

[Claim 26] Said reserve regurgitation location is the regurgitation method of recovery of an ink jet recording device given in either of claims 17-25 characterized by carrying out a multi-statement on said conveyance object.

[Claim 27] The regurgitation method of recovery of an ink jet recording device given in either of claims 17-26 characterized by removing ink of said reserve regurgitation location during record actuation of an image by said recording head.

[Claim 28] The regurgitation method of recovery of an ink jet recording device given in either of claims 17-26 characterized by removing ink of said reserve regurgitation location after record actuation termination of an image by said recording head.

[Claim 29] The regurgitation method of recovery of an ink jet recording device given in either of claims 17-28 characterized by making said record medium-ed adsorb on said conveyance object.

[Claim 30] Said conveyance object is the regurgitation method of recovery of an ink jet recording device given in either of claims 17-29 characterized by being the conveyance belt which carries out circulation migration.

[Claim 31] Said recording head is the regurgitation method of recovery of an ink jet recording device given in either of claims 17-30 which are two or more recording heads in which the regurgitation [ink which shifts in the conveyance direction of said record medium-ed, and locates and is different] is possible, and are characterized by making said reserve regurgitation location carry out the reserve regurgitation of the ink one by one from said two or more recording

heads according to a conveyance location of said record medium-ed.

[Claim 32] Said recording head is the regurgitation method of recovery of an ink jet recording device given in either of claims 17-31 characterized by having an electric thermal-conversion object which generates heat energy as energy for making ink breathe out.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] This invention relates to the ink JIETSU recording device which records on record media-ed, such as the recording paper, by breathing out ink, and its regurgitation method of recovery.

[0002]

[Description of the Prior Art] it is easy for miniaturization of a recording head to be easy and to be able to record a high definition image at high speed, for there to be little noise, since a running cost is cheap and it is a non impact method, and for an ink jet recording device to record on a record medium-ed by breathing out ink from a recording head, and to record a color picture moreover generally, using multicolor ink -- etc. -- it has the advantage. Much more improvement in the speed of record is possible for the recording device of the full line mold which used the recording head of the line type with which many deliveries were arranged along the cross direction of the paper as a record medium-ed especially, for example.

[0003] However, in the recording device of such a full line mold, from the recording head of the top style side location of the conveyance direction of the recording paper, since the distance to the recording head of a downstream location becomes quite long most, in a record section, the relief of the recording paper as a record medium-ed occurs, a record image is confused or there is also a possibility of becoming the cause of a jam etc. Therefore, it is necessary to energize it below so that the recording paper may not come floating. As the means, a conductive electrode is prepared, a charge is given, electrostatic force is generated, and, generally many methods of making a record sheet adsorb are used.

[0004] Moreover, the reserve regurgitation is processing performed in order to maintain the ink discharging performance of a recording head good in ink jet equipment. That is, it removes from a recording head with ink, detailed air bubbles, etc. in a recording head which were thickened to the regurgitation of ink by making the ink which does not participate in record breathe out to predetermined locations for example, other than the recording paper. These thickening ink and detailed air bubbles have reduction of the amount of regurgitation ink, the deflection of a discharge direction, and a possibility of causing the poor regurgitation, such as non-regurgitation of ink, further, and when the ink regurgitation is not made for a long time, it becomes easy to produce them.

[0005] The reserve regurgitation made in order to eliminate such thickening ink etc. is performed with a fixed time interval, while the time of an equipment power supply being switched on and the power supply are generally switched on. For example, the reserve regurgitation with 500 regurgitation is performed immediately after powering on, and the reserve regurgitation with 20 regurgitation is performed just before record. Moreover, when it has two or more recording heads for color record, the timing of the reserve regurgitation may be changed for each [corresponding to an ink color] recording head of every.

[0006] In such an ink jet recording device, the record sheet as a record medium-ed to which paper has been fed by feed equipment is conveyed with a conveyance belt in a record section, being adsorbed and held with the electrostatic fixing disc prepared in the platen on the conveyance belt upper surface, and being recorded by the recording head.

[0007] In such an ink jet recording device, in the case of the thing of a configuration of moving a recording head to the location of the reserve regurgitation receptacle which consists of adsorbent in which it was prepared out of the conveyance belt, in order to perform the reserve regurgitation, migration of the recording head will take long time amount, so that a recording head is enlarged. In the recording device of such a configuration, when the reserve regurgitation is performed, the warm-up time of a power up becomes long, or record actuation is interrupted at every reserve regurgitation between the record pages under record actuation, and the record time becomes long.

[0008] As countermeasures of such nonconformity, as the reserve regurgitation is made the predetermined location on a conveyance belt, the method which cleans the conveyance hair side of belt side which became dirty by the reserve

regurgitation is learned according to the cleaning device established on the conveyance belt.

[0009]

[Problem(s) to be Solved by the Invention] However, in the case of the above-mentioned conventional ink jet recording device, since the location on the conveyance belt which performs the reserve regurgitation is defined fixed beforehand, when performing the reserve regurgitation, the portion (henceforth a "reserve regurgitation field") of the conveyance belt for performing the reserve regurgitation needs to be conveyed even in opposite locations with a recording head, such as directly under [head].

[0010] For this reason, after carrying forward a conveyance belt so that a reserve regurgitation field may come directly under an arm head first when it is going to perform the reserve regurgitation, and there is no reserve regurgitation field directly under an arm head, it is necessary to perform the reserve regurgitation. In the case of the ink jet recording device which has two or more recording heads which correspond to record of a color picture, since it is necessary to perform the reserve regurgitation for every recording head, the reserve regurgitation of the specified quantity must be performed moving a reserve regurgitation field directly under each recording head, and the duration for the reserve regurgitation becomes long in proportion to the number of a recording head.

[0011] Moreover, when there are few reserve regurgitation fields prepared on the conveyance belt, moving the reserve regurgitation field even directly under an arm head also takes time amount, when the worst, a conveyance belt may be carried forward near a round and most time amount may be required an indispensable **.

[0012] This invention is made in view of such a trouble, and the object is in offering the regurgitation method of recovery of the ink jet recording device which can perform high-speed record, and an ink jet recording device, without spending time amount useless for the reserve regurgitation by carrying out adjustable setting out of the reserve regurgitation location on conveyance objects, such as a conveyance belt.

[0013]

[Means for Solving the Problem] An ink jet recording device of this invention to a record medium-ed conveyed while it had been laid in a conveyance object By carrying out the reserve regurgitation of the ink which records an image using a recording head in which the regurgitation [ink] is possible, and is not contributed to record of an image from said recording head In an ink jet recording device which can recover discharging performance of said recording head A setting-out means which carries out adjustable setting out of the reserve regurgitation location which avoided said record medium-ed on said conveyance object according to an installation location of said record medium-ed on said conveyance object, It is characterized by equipping said reserve regurgitation location with a control means to which the reserve regurgitation of the ink is carried out from said recording head, and a cleaning means to remove ink breathed out in said reserve regurgitation location.

[0014] The regurgitation method of recovery of an ink jet recording device of this invention By carrying out the reserve regurgitation of the ink which records an image on a record medium-ed conveyed while it had been laid in a conveyance object using a recording head in which the regurgitation [ink] is possible, and is not contributed to record of an image from said recording head In the regurgitation method of recovery of an ink jet recording device which can recover discharging performance of said recording head It responds to an installation location of said record medium-ed on said conveyance object. On said conveyance object After carrying out adjustable setting out of the reserve regurgitation location which avoided said record medium-ed and making said reserve regurgitation location carry out the reserve regurgitation of the ink from said recording head, it is characterized by removing ink breathed out by said reserve regurgitation location.

[0015]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained based on a drawing.

[0016] (1st operation gestalt) Drawing 1 and drawing 2 are structural drawings inside the ink jet recording device concerning this invention. The recording device 1 with automatic feeding equipment consists of the feed section 2, a paper feeding part 3, a delivery unit 4, and the recording head section 7. The cross section in which drawing 1 shows the whole recording device 1 configuration, and drawing 2 are the configuration cross sections of the paper feeding part 3 of a recording device 1. Hereafter, these drawing 1 and drawing 2 are used and they are (Item I) feeding section and a paper feeding part (II) (III) about each part 2, 3, 7, and 4, It divides into the recording head section and the (IV) delivery unit, and explains.

[0017] (I) The feed section feeding section 2 has the pressure plate 21 which loads the recording paper P as a record medium-ed into the base 20, and the composition of having attached the feed body of revolution 22 which feeds paper to the recording paper P. The pressure plate 21 is made pivotable the center [the axis of rotation a combined with the base 20], and is energized in the direction of the feed body of revolution 22 with the pressure plate spring 24. In order to prevent **** of the recording paper P, the separation pad 25 which consists of construction material with large

coefficient of friction of artificial leather etc. is formed in the part of the feed body of revolution 22 and the pressure plate 21 which counters. Furthermore, in order to separate one sheet of recording paper P at a time, on the other hand, non-illustrated lily Society for Cutting Up Men of the recording paper P of which contact on the wrap separation pawl 26, and a pressure plate 21 and the revolution feed object 22 is canceled is prepared in the base 20 in the corner of the opposite side.

[0018] In the above-mentioned configuration, lily Society for Cutting Up Men is depressing the pressure plate 21 to the predetermined location in the state of standby. Thereby, the contact to a pressure plate 21 and the feed body of revolution 22 is canceled. And in this condition, by transmitting the driving force of the conveyance roller 32 mentioned later by a gear etc. to the feed body of revolution 22 and lily Society for Cutting Up Men, lily Society for Cutting Up Men separates from a pressure plate 21, a pressure plate 21 goes up, and the recording paper P contacts the feed body of revolution 22. And with the revolution of the feed body of revolution 22, the recording paper P is taken up, feeding begins, by the separation pawl 26, one sheet dissociates at a time and the recording paper P is sent to a paper feeding part 3. After rotating until the feed body of revolution 22 sends the recording paper P into a paper feeding part 3, it will be in the standby condition of which the contact to the recording paper P and the feed body of revolution 22 was canceled again, and the driving force from the conveyance roller 32 will be turned off.

[0019] 90 is the feed body of revolution for manual paper feeds. According to the record instruction signal from control sections, such as a computer, paper is fed to the recording paper P installed on the detachable tray 91 by the feed body of revolution 90, and it is conveyed to the conveyance roller 32 section.

[0020] (II) The paper feeding part paper feeding part 3 has the conveyance belt 31 which adsorbs the recording paper P and conveys it, and non-illustrated PE sensor. The conveyance belt 31 is constructed across by the conveyance roller 32 and the pressure roller 35 which are a follower roller so that it may drive with a driving roller 34. Support arm 51A by which the pressure roller 35 was attached at the head is energized in the direction which is supported to revolve free [rotation of the end face], and pushes the pressure roller 35 against the conveyance belt 31 by spring 51B.

[0021] The conveyance belt 31 and the pinch roller 33 which follows are formed in the conveyance roller 32 and the location which counters in contact with the conveyance belt. A pinch roller 33 leads the recording paper P to the Records Department by carrying out a pressure welding to the conveyance belt 31 with the spring which is not illustrated. Furthermore, the guide 27 when guiding the recording paper P, and the bottom guide 28 are arranged in the entrance of the paper feeding part 3 with which the recording paper P is conveyed. Moreover, in order to detect the head and the back end of the recording paper P, PE sensor lever 29 of PE sensor (un-illustrating) is formed in the top guide 27. Furthermore, the recording head 7 which forms an image on the recording paper P based on image information is formed in the downstream in the recording paper conveyance direction of the conveyance roller 32.

[0022] In the above-mentioned configuration, the recording paper P sent to the paper feeding part 3 is guided at the top guide 27 and the bottom guide 28, and is sent by the roller pair of the conveyance roller 32 and a pinch roller 33. At this time, it asks for record locations, such as printing of the recording paper P, by detecting the head of the conveyed recording paper P by PE sensor lever 29. Moreover, the recording paper P is conveyed when the conveyance belt 31 rotates through the conveyance roller 32 by the below-mentioned ultrasonic motor.

[0023] (III) As a recording head 7 of a recording head **** operation gestalt The ink jet recording head of the line type with which two or more nozzles were arranged is used in the conveyance direction of the recording paper P, and the direction (drawing 1 , the direction of the front reverse side of the space of drawing 2) which intersects perpendicularly. the object for black ink regurgitation from the conveyance direction upstream of the recording paper P -- recording head 7K, recording head 7C for cyanogen ink regurgitation, and the object for Magenta ink regurgitation -- recording head 7M and recording head 7Y for yellow ink regurgitation are arranged at intervals of predetermined at the order. The recording head 7 is attached in the head holder. This recording head 7 can give heat at a heater etc. to ink. And film boiling of the ink is carried out with this heat, ink is breathed out from the nozzle of a recording head 7 by the pressure variation produced by growth or contraction of air bubbles according to this film boiling, and an image is formed on the recording paper P of that ink drop.

[0024] The distance between a nozzle side and the recording paper P (between papers) is prescribed by when lobe 7A and the rail 72 with which the end was supported to revolve rotatable with the shaft 71 and the recording head 7 was formed in the other end are engaged.

[0025] (IV) The delivery unit delivery unit 4 is constituted by the delivery roller 41 and the spur 42. The recording paper P by which image formation was carried out at the Records Department is inserted into the delivery roller 41 and a spur 42, is conveyed, and is discharged on a paper output tray 43.

[0026] (Records Department) Next, the configuration and actuation of adsorption conveyance in the Records Department are explained using drawing 1 and drawing 2 .

[0027] 31 is a conveyance belt which moves adsorbing the recording paper P and holding it, is made of synthetic resin, such as polyethylene with a thickness of about 0.1mm - about 0.2mm and a polycarbonate, and has constituted the endless belt configuration. 36 is an adsorption power generating means and fixed disposition is carried out in the location which counters a recording head 7. This adsorption power generating means 36 is connected to the high voltage power supply (un-illustrating) which the record portion by the recording head 7 and the conveyance belt 31 which counters are made to generate adsorption power, and generates predetermined high tension by impressing the voltage of about 0.5v - 10kV.

[0028] As mentioned above, 32, 34, and 35 are rollers which give moderate tension in support of the conveyance belt 31, and the roller 34 is connected to the paper feed motor 50. Moreover, the paper bail member 39 is attached free [rotation] by making the axis of rotation of a pinch roller 33 into a center of rotation as a press means to press down the recording paper P to the conveyance belt 31 side, and the paper bail member 39 is energized by the energization means which is not illustrated at the conveyance belt 31 side. The paper bail member 39 is constituted by the conductive metal plate.

[0029] 38 is a cleaning roller pair, and it is prepared so that a belt 31 may be compressed. This roller pair 38 can absorb ink that dirt, such as ink adhering to a belt 31, should be removed, and in order to prevent deterioration in endurance, it is formed with the sponge of **** with a small (10 micrometers - 30 micrometers are desirable) pore diameter.

[0030] Next, actuation is explained.

[0031] The recording paper P is pinched by a pinch roller 33 and the conveyance belt 31, is led to the Records Department, and advances into the adsorption power generating section with the condition of having been pressed down by the paper presser-foot member 39 at the conveyance belt 31 side. And the recording paper P is sent in the direction of arrow head a with the paper feed motor 50 and a roller 34, while it sticks to the flat-surface section of the conveyance belt 31 by the adsorption power given from the adsorption power generating means 36 and printing etc. is recorded by the recording head 7. Since there is no portion which protrudes toward the conveyance belt 31 holding the recording paper P to a recording head 7 side at the time of record of the head of the recording paper P and a back end portion at this time, it can record making the regurgitation nozzle of a recording head endmost part, and the edge of the recording paper P approach, and an accurate record image is obtained.

[0032] Moreover, when ink is breathed out so much by the recording paper P, the recording paper P swells and flapping (cock ring) occurs. Since the conveyance belt 31 side is adsorbed in the recording paper P also in this case according to the adsorption power of the adsorption power generating means 36, and the presser-foot force of the paper presser-foot member 39, the float by the side of the arm head 7 of the recording paper P is lost, and stable record without contact on a recording head 7 and the recording paper P can be performed. Moreover, even when the edge of the recording paper P lenticulates or curl occurs by change of environment, such as temperature and humidity, the recording paper P is pushed against the conveyance belt 31 side by the paper bail member 39, and since the recording paper P can be conveyed to the adsorption power generating section where flapping and curl are removed, adsorption stabilized at the Records Department can be performed.

[0033] (Control section) Drawing 3 is the block diagram showing the control section of the ink jet recording device concerning this invention, and the configuration of the device controlled by the control section.

[0034] As mentioned above, for 7K, the recording head for blacks and 7C are [the recording head for MAZENDA and 7Y of the recording head for cyanogen and 7M] the recording heads for yellow. 100 is a solenoid for controlling a cleaning roller 38. 50 is a motor which drives the driving roller 34 for driving the conveyance belt 31. 102 is a sensor for detecting the criteria location of the conveyance belt 31. 103 is a sensor for detecting the form edge of the recording paper P, and is connected to PE sensor lever 29. In addition, although the sensor 102 for conveyance belt location detection was not illustrated in drawing 1 and drawing 2, it is formed in the rear-face side of the conveyance belt 31 between the conveyance roller 32 and the pressure roller 35.

[0035] 80 is a control section. ROM and 80c in which CPU and 80b store a program in 80a are the memory required for control for works, 80d is a gate array, and each is connected through the system bus. Gate array 80d, reading of the information from the control signal of the motor 50 for driving rollers and the motor 101 for feed body of revolution, the control signal of the solenoid 100 for cleaning rollers, the picture signal to a recording head 7, the control signal of a recording head 7, the sensor for dirt detection of the conveyance belt 31, and the PE sensor 103 etc. is performed.

[0036] Drawing 4 (a), (b), and (c) are drawings which illustrate the physical relationship of the recording paper P and the reserve regurgitation field on the conveyance belt 31, setting out of a reserve regurgitation field, the reserve regurgitation, and the state transition of cleaning. For the recording paper, and I1, I2 and I3, as for the distance between papers, and L2, the reserve regurgitation field on the conveyance belt 31 and L1 are [P / the distance between the head of the recording paper P and the reserve regurgitation field I3 and L3] the distance between PE sensor lever 29 and

recording head 7K. The reserve regurgitation fields I1, I2, and I3 are set up as a location ahead of a predetermined gap not from the fixed position on the conveyance belt 31 but from the head of the recording paper P. The number of reserve regurgitation fields also changes with not immobilization but the total extension of the conveyance belt 31, the gap of a recording head 7 and a cleaning device, the sizes of the recording paper P conveyed, etc. In instantiation of drawing 4 (a), (b), and (c), three reserve regurgitation fields I1, I2, and I3 exist. In drawing 4 (a), it is shown that the reserve regurgitation field I1 has ink which adhered to the conveyance belt 31 by the reserve regurgitation in the location cleaned by the cleaning roller 38. Moreover, the reserve regurgitation field I3 in drawing 4 (a) is directly under [of a Magenta] recording head 7M, and is located in the location where the reserve regurgitation of recording head 7M of MAZENDA is performed following black and the reserve regurgitation of each recording heads 7K and 7C of cyanogen. Drawing 4 (b) shows the condition that the reserve regurgitation field I3 on the conveyance belt 31 went to directly under [of recording head 7Y of yellow].

[0037] Drawing 5, drawing 6, and drawing 7 are the flow charts for explaining control of the ink jet recording device concerning this invention.

[0038] First, the reserve regurgitation processing shown with the flow chart of drawing 5 is called by the interruption event whenever paper is fed to the recording paper P during record actuation. It stands by until feed of the head of the recording paper P is carried out to the location of PE sensor lever 29 arranged at the upstream of the conveyance belt 31 by step S101. The condition of the recording paper P is detected by supervising the change of state of the PE sensor 103 connected to PE sensor lever 29.

[0039] If the head of the recording paper P reaches PE sensor lever 29, the head location of the form P on the conveyance belt 31 will be acquired (step S102). Location detection of the conveyance belt 31 is performed by acquiring the step count counted by belt location management processing of drawing 7 mentioned later, i.e., the step count showing the relative position from the criteria location of the conveyance belt 31, (only henceforth a "step count") if needed in each step. Therefore, the head location of Form P is acquirable by amending the step count acquired at the event of this step S102 by the number of steps equivalent to the distance from the conveyance belt criteria location detection sensor 102 to PE sensor lever 29.

[0040] Next, the distance L3 between PE sensor lever 29 which has become settled beforehand, and recording head 7K is acquired from ROM80b (step S103). Moreover, the distance L1 between papers similarly defined beforehand is acquired from ROM80b, the distance L1 between the paper and distance L3 are doubled, and the location of the proper reserve regurgitation field I4 is determined (step S104). In this example, as for the reserve regurgitation field I4, only the distance of L2 is ahead set up from the head of the recording paper P. Distance L2 is set to one half of the distance L1 between papers.

[0041] Next, it stands by until the reserve regurgitation field I4 on the conveyance belt 31 determined in this way arrives at directly under [which is recording head 7K] (step S105). That is, when the conveyance belt 31 advances only in the number of steps equivalent to distance L3, it means arriving at directly under [whose set-up reserve regurgitation field I4 is recording head 7K] from the step count when detecting the head of the recording paper P. And if the reserve regurgitation field I4 reaches directly under recording head 7K, only recording head 7K will perform predetermined reserve discharging (step S106).

[0042] Next, the location of the reserve regurgitation field I4 on the conveyance belt 31 which performed such reserve regurgitation is acquired (step S107), and additional conservation of the location is carried out at the table of RAM80c of the format shown in drawing 8 (step S108). The records of all the reserve regurgitation fields that exist on the conveyance belt 31 are created by this table (it is henceforth called a "reserve regurgitation list"), and the information for one reserve regurgitation field is recorded on it for every record. A record consists of locations of a record number and the reserve regurgitation field expressed with a step count etc. In addition, since the record about the reserve regurgitation field cleaned by belt cleaning treatment is deleted by the belt cleaning treatment of the flow chart shown in drawing 6, only the information on a reserve regurgitation field always effective in a reserve regurgitation list is held.

[0043] Then, the distance L5 between recording head 7K and recording head 7C is acquired (step S109). And after standing by like step S105 until the reserve regurgitation field I4 on the recording head 7 conveyance belt 31 in which K carried out the reserve regurgitation previously reaches directly under recording head 7C (step S110), only recording head 7C performs the predetermined reserve regurgitation to the reserve regurgitation field I4 (step S111).

[0044] Then, distance L6 between recording head 7C and recording head 7M is acquired (step S112). And after standing by until the reserve regurgitation field I4 on the conveyance belt 31 in which recording head 7C carried out the reserve regurgitation arrives at directly under [which is recording head 7M] (step S113), only recording head 7M perform the predetermined reserve regurgitation to the reserve regurgitation field I4 (step S114).

[0045] Then, the distance L7 between recording head 7M and recording head 7Y is acquired (step S115). And after

standing by until the reserve regurgitation field I4 on the recording head 7 conveyance belt 31 in which M carried out the reserve regurgitation reaches directly under recording head 7Y (step S116), only recording head 7Y performs the predetermined reserve regurgitation to the reserve regurgitation field I4 (step S117).

[0046] Thus, when paper is fed to the recording paper P, the reserve regurgitation of each recording head with which the ink jet recording device is equipped is made to perform to the reserve regurgitation field I4 which was not fixed and carried out adjustable setting out dynamically that is, according to conditions one by one according to a motion of a conveyance belt. I1, I2, and I3 in drawing 4 (a), (b), and (c) are a reserve regurgitation field set up dynamically [when paper is fed to the recording paper P] like such a reserve regurgitation field I4.

[0047] The belt cleaning treatment shown with the flow chart of drawing 6 is called according to the time of the conveyance belt 31 beginning to move for record actuation.

[0048] First, the location PA on the conveyance belt 31 in directly under [of a cleaning roller 38] is acquired (step S201). The location of a cleaning roller 38 is acquired by amending the step count from the criteria location of the conveyance belt 31 like the case of reserve regurgitation processing of drawing 5 by the number of steps equivalent to the distance between the conveyance belt criteria location detection sensors 102 and cleaning rollers 38 on the conveyance belt 31.

[0049] Next, the reserve regurgitation field in the location nearest to a cleaning roller 38, i.e., the reserve regurgitation field most moved to an opposite location with a cleaning roller 38 early, is acquired from the reserve regurgitation list illustrated by drawing 8 (step S202).

[0050] And the distance between the location of the conveyance belt 31 directly under a cleaning roller acquired at step S201 and the location PB on the conveyance belt 31 of the reserve regurgitation field acquired at step S202 is acquired (step S203). When it illustrates in the case of drawing 4 (c), the distance acquired at step S203 is equivalent to distance L8.

[0051] After standing by based on the distance acquired at this step S203 until a reserve regurgitation field arrives at the location (it is also called a "cleaning location") of cleaning roller 38 directly under (step S204), predetermined cleaning treatment is performed using a cleaning roller 38 (step S205), and the ink by which the reserve regurgitation was carried out to the reserve regurgitation field of the conveyance belt 31 is removed.

[0052] Next, the record of the reserve regurgitation field which carried out the completion of cleaning is deleted from the reserve regurgitation list illustrated by drawing 8 (step S206).

[0053] And the existence of the reserve regurgitation field record which finally is not cleaning by checking a reserve regurgitation list is judged (step S207). Since, as for a reserve regurgitation list, sequential deletion of the unnecessary record [finishing / cleaning] is carried out at step S206, the judgment of step S207 should just check the existence of a record. When the reserve regurgitation field which should be cleaned still repeats the processing from step S201 by the judgment in a certain case, cleaning treatment is performed continuously. And cleaning treatment is ended when all the records disappear from a reserve regurgitation list.

[0054] The belt location management processing shown in the flow chart of drawing 7 is called whenever it drives one step of motors 50 for driving rollers.

[0055] First, detection of a belt criteria location is performed in step S301. The sensor for conveyance belt dirt detection formed in detection at this time in order to detect belt dirt is used, and the mark pattern for belt criteria location detection by which marking was beforehand carried out to the piece place of the conveyance belt 31 is detected. In this example, even if it detects a belt criteria location by the photo sensor, the continuous line of the specific color formed so that it might cross crosswise [of the conveyance belt 31] and might lengthen is considered as the mark for belt criteria location detection so that it may be easy to distinguish from the belt dirt in ink etc. And based on the detection information on such a sensor, the detection location of the current conveyance belt 31 by the sensor judges whether it is a belt criteria location (step S302). A comparison, the belt criteria location pattern prepared beforehand, and the information on detection of a sensor, i.e., a reading pattern, performs this judgment simply.

[0056] When judged with a current detection location being a belt criteria location by such judgment, the step counter which shows the amount of actuation of the motor 50 from the belt criteria location is reset (step S303). Moreover, when a judgment result is not a belt criteria location, a step counter is incremented and the amount of actuation is counted.

[0057] Thus, in reserve regurgitation processing of drawing 5, and the belt cleaning treatment of drawing 6, the location of the conveyance belt 31 can be pinpointed to the timing of arbitration by establishing a means to distinguish the specific location of the conveyance belt 31, and always carrying out management maintenance of the amount of gaps of the conveyance belt 31 from a sensor location.

[0058] (2nd operation gestalt) This invention is not limited to the gestalt of operation mentioned above.

[0059] In the above-mentioned example, when the location of the reserve regurgitation field on the conveyance belt 31 was fed to the recording paper P, it had set dynamically to every recording paper P. However, when paper is fed to the 1st page at the time of a recording start, you may make it set up two or more reserve regurgitation fields, since the reserve regurgitation field after the 2nd can be determined based on the conveyance direction size of the recording paper P, and the distance between papers after setting up a one-eyed reserve regurgitation location when the paper size of the recording paper P once treated by record processing is fixed.

[0060] Thus, by constituting, whenever it feeds paper to the recording paper P, it becomes unnecessary to set up a reserve regurgitation field newly, and the processing under record actuation can be mitigated, and it is effective.

[0061] (3rd operation gestalt) In the above-mentioned example, cleaning treatment of the conveyance belt 31 was serially performed during record actuation again.

[0062] However, when the conveyance belt 31 drives by 1 round from the time of a recording start and the reserve regurgitation field for the 1 round is set as the conveyance belt 31, you may make it suspend new setting out of the reserve regurgitation field after it. In this case, cleaning treatment is not performed during record actuation, but setting out of a reserve regurgitation field is held. And after the 1st round of the conveyance belt 31, by controlling the feed timing of the recording paper P, referring to a reserve regurgitation list, paper is fed to the recording paper P between two reserve regurgitation fields on the conveyance belt 31 so that the recording paper P may not appear in a reserve regurgitation field. And you may make it clean altogether the reserve regurgitation field on the conveyance belt 31 after record termination, referring to a reserve regurgitation list.

[0063] Thus, by constituting, the count of cleaning treatment can be reduced and it can suppress exhausting [by cleaning treatment / of the conveyance belt 31 a cleaning roller 38, etc. / exhausting / deterioration and]. Moreover, the adverse effect to the record image resulting from an oscillation of the adverse effect 31 by performing cleaning treatment, i.e., a conveyance belt, etc. can be avoided during record actuation, and it is effective in it.

[0064] (4th operation gestalt) In the above-mentioned example, distance between papers was fixed and the reserve regurgitation field was set up ahead [of the recording paper / head side] again based on the distance.

[0065] However, in advance of record, the size of the recording paper P to which it is going to feed paper may be acquired, and a reserve regurgitation field may be set up suitably on the perimeter of the conveyance belt 31 based on the paper size. At this time, the minimum distance between papers is maintained, and it sets up so that most many reserve regurgitation fields can be arranged. And you may make it control the feed timing of the recording paper P, and the distance between papers to be located between the recording papers P before and behind on the conveyance belt 31 so that the reserve regurgitation field beforehand set up in this way at the time of a recording start is located between papers that is,.

[0066] (5th operation gestalt) In the above-mentioned example, the reserve regurgitation location between papers was determined again only based on a predetermined distance between papers.

[0067] However, the contents of processing of the reserve regurgitation which it is going to process immediately after (the count of the reserve regurgitation, reserve regurgitation pattern, etc.) are embraced, and you may make it amend the location of the reserve regurgitation field between papers. That is, it is because it is continuing being conveyed by the predetermined paper bearer rate, without the conveyance belt 31 stopping also in case the reserve regurgitation is performed, so the reserve regurgitation field has a certain amount of width of face in the conveyance direction according to the bearer rate, the count of the reserve regurgitation, etc. That is, it is because the distance of the reserve regurgitation field and recording paper P may become narrow and it may have an adverse effect on record on the continuing recording paper P, if the width of face in the conveyance direction of a reserve regurgitation field becomes large. An example of the number of formation of the ink dot by the amount of placing, i.e., the reserve regurgitation, of the ink equivalent to the count of the reserve regurgitation is shown in the right column in the table of drawing 8.

[0068] When there are more counts of the reserve regurgitation than usual, by amending the location of a reserve regurgitation field ahead [conveyance direction], and bringing the initiation timing of the reserve regurgitation forward, a possibility of having an adverse effect on record does not have many counts of the regurgitation, either, they can perform recording head recovery, and are very more effective than usual there.

[0069] (6th operation gestalt) You may be equipment further which can, in addition, print the thing which takes the gestalt of the reproducing unit combined with others, a reader, etc. although used as an image printing terminal of information management systems, such as a computer, as a gestalt of the ink jet recording device of this invention, and the facsimile apparatus which has a transceiver function further, cloth, etc.

[0070] (in addition to this) In addition, especially this invention is equipped with means (for example, an electric thermal-conversion object, a laser beam, etc.) to generate heat energy as energy used also in an ink jet recording method in order to make the ink regurgitation perform, and brings about the effect which was excellent in the recording head of

the method which makes the change of state of ink occur with said heat energy, and the recording device. It is because the densification of record and highly minute-ization can be attained according to this method.

[0071] About the typical configuration and typical principle, what is performed using the fundamental principle currently indicated by the U.S. Pat. No. 4723129 description and the 4740796 description, for example is desirable. Although this method is applicable to both the so-called mold on demand and a continuous system On the electric thermal-conversion object which is especially arranged corresponding to the sheet and liquid route where the liquid (ink) is held in the case of the mold on demand By impressing at least one driving signal which gives the rapid temperature rise which supports recording information and exceeds nucleate boiling Since make an electric thermal-conversion object generate heat energy, the heat operating surface of a recording head is made to produce film boiling and the air bubbles in the liquid (ink) corresponding to this driving signal can be formed by one to one as a result, it is effective. A liquid (ink) is made to breathe out through the opening for regurgitation by growth of these air bubbles, and contraction, and at least one drop is formed. If this driving signal is made into a pulse configuration, since growth contraction of air bubbles will be performed appropriately instancy, the regurgitation of a liquid (ink) excellent in especially responsibility can be attained, and it is more desirable. As a driving signal of this pulse configuration, what is indicated by the U.S. Pat. No. 4463359 description and the 4345262 description is suitable. In addition, if the conditions indicated by the U.S. Pat. No. 4313124 description of invention about the rate of a temperature rise of the above-mentioned heat operating surface are adopted, further excellent record can be performed.

[0072] As a configuration of a recording head, the configuration using the U.S. Pat. No. 4558333 description and U.S. Pat. No. 4459600 description which indicate the configuration arranged to the field to which the heat operation section other than the combination configuration (a straight-line-like liquid flow channel or right-angle liquid flow channel) of a delivery which is indicated by each above-mentioned description, a liquid route, and an electric thermal-conversion object is crooked is also included in this invention. In addition, the effect of this invention is effective also as a configuration based on JP,59-138461,A which indicates the configuration whose puncturing which absorbs the pressure wave of JP,59-123670,A which indicates the configuration which makes a common slit the regurgitation section of an electric thermal-conversion object to two or more electric thermal-conversion objects, or heat energy is made to correspond to the regurgitation section. Namely, no matter the gestalt of a recording head may be what thing, it is because it can record now efficiently certainly according to this invention.

[0073] Furthermore, this invention is effectively applicable also to the recording head of the full line type which has the length corresponding to the maximum width of the record medium which can record a recording device. As such a recording head, any of the configuration which fills the length with the combination of two or more recording heads, and the configuration as one recording head formed in one are sufficient.

[0074] In addition, this invention is effective also when the thing of a serial type like the example of a top also uses the recording head fixed to the main part of equipment, the recording head exchangeable chip type to which the electric connection with the main part of equipment and supply of the ink from the main part of equipment are attained by the main part of equipment being equipped, or the recording head of the cartridge type with which the ink tank was formed in the recording head itself in one.

[0075] Moreover, it is a book as a configuration of the recording device of this invention to add the regurgitation recovery means of a recording head, a preliminary auxiliary means, etc. If these are mentioned concretely, a preheating means to heat using the capping means, the cleaning means, the application of pressure or the attraction means, the electric thermal-conversion object, the heating elements different from this, or such combination over a recording head, and a reserve regurgitation means to perform the regurgitation different from record can be mentioned.

[0076] Moreover, although only one piece was prepared also about the class thru/or the number of a recording head carried, for example corresponding to monochromatic ink, corresponding to two or more ink which differs in an others and record color or concentration, more than one may be prepared the number of pieces. That is, although not only the recording mode of only mainstream colors, such as black, but a recording head may be constituted in one as a recording mode of a recording device or the paddle gap by two or more combination is sufficient, for example, this invention is very effective also in equipment equipped with at least one of each of the full color recording mode by the double color color of a different color, or color mixture.

[0077] Furthermore, in addition, in this invention example explained above, although ink is explained as a liquid It is ink solidified less than [a room temperature or it], and what is softened or liquefied at a room temperature may be used. Or by the ink jet method, since what carries out temperature control is common as a temperature control is performed for ink itself within the limits of 30 degrees C or more 70 degrees C or less and it is in a stability regurgitation range about the viscosity of ink, ink may use what makes the shape of liquid at the time of activity record signal grant. In addition, in order to prevent the temperature up by heat energy positively because you make it use it as energy of the

change of state from a solid condition to the liquid condition of ink, or in order to prevent evaporation of ink, the ink which solidifies in the state of neglect and is liquefied with heating may be used. Anyway, ink liquefies by grant according to the record signal of heat energy, and this invention can be applied also when using the ink of the property which will not be liquefied without grant of heat energy, such as that by which liquefied ink is breathed out, and a thing which it already begins to solidify when reaching a record medium. The ink in such a case is good for a porosity sheet crevice or a breakthrough which is indicated by JP,54-56847,A or JP,60-71260,A also as liquefied or a gestalt which counters to an electric thermal-conversion object in the condition of having been held as a solid. In this invention, the most effective thing performs the film-boiling method mentioned above to each ink mentioned above.

[0078] Furthermore, in addition, as a gestalt of this invention ink jet recording device, although used as an image printing terminal of information management systems, such as a computer, the gestalt of the reproducing unit combined with others, a reader, etc. and the facsimile apparatus which has a transceiver function further may be taken.

[0079]

[Effect of the Invention] According to this invention, as explained in full detail above, the reserve regurgitation location on conveyance objects, such as a conveyance belt, is set as adjustable, and an image can be recorded, without [in order to remove reserve discharge and its ink by which the reserve regurgitation was carried out for ink from a recording head in the reserve regurgitation location which carried out adjustable setting out, without it interrupts record processing of an image, and] reducing a recording rate.

[0080] Moreover, since adjustable setting out of the reserve regurgitation location can be carried out, the conveyance initiation with conveyance objects, such as a conveyance belt, can supply the recorded bodies, such as the recording paper, to the location of arbitration. therefore -- for example, conveyance objects, such as a conveyance belt, are redundant -- location appearance is carried out, processing becomes unnecessary, and the output time amount (first print) of the 1st record medium-ed, such as the recording paper, can be shortened.

[Translation done.]

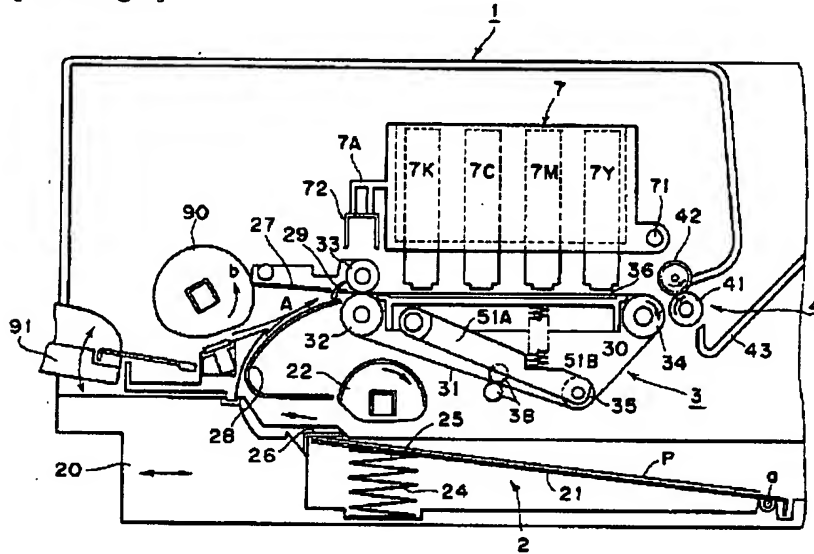
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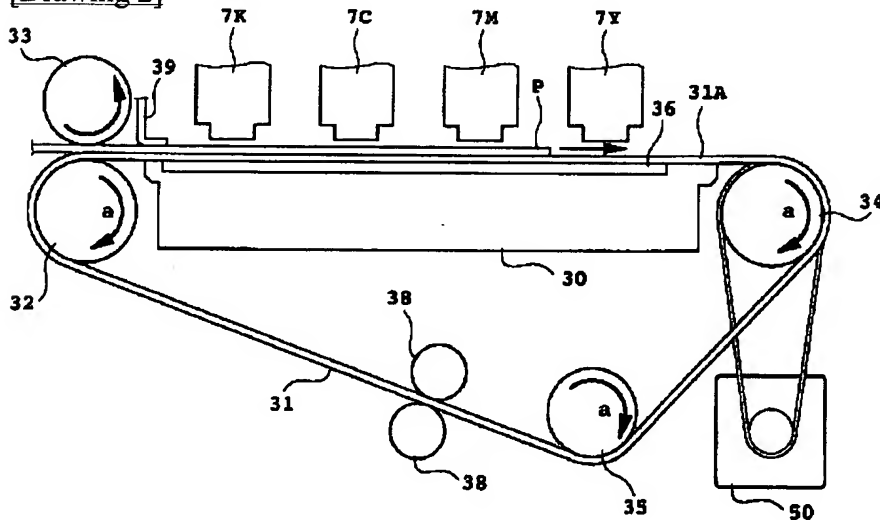
1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DRAWINGS

[Drawing 1]



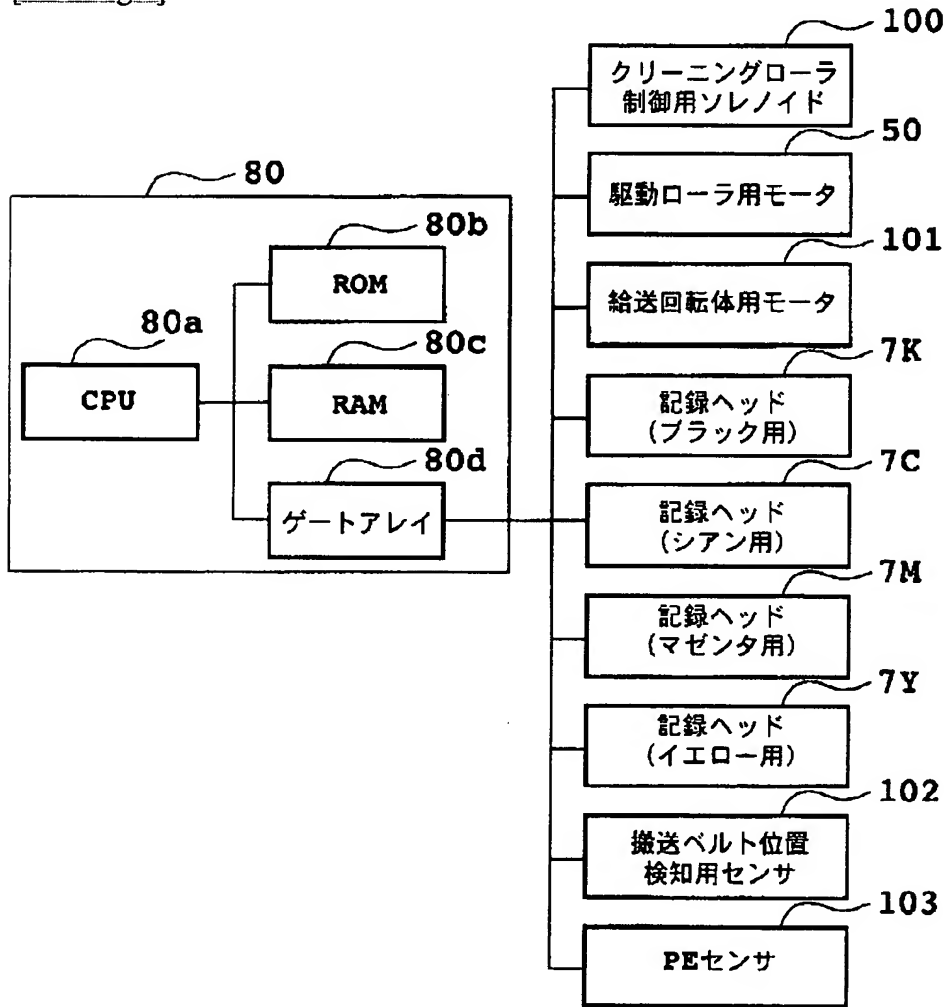
[Drawing 2]



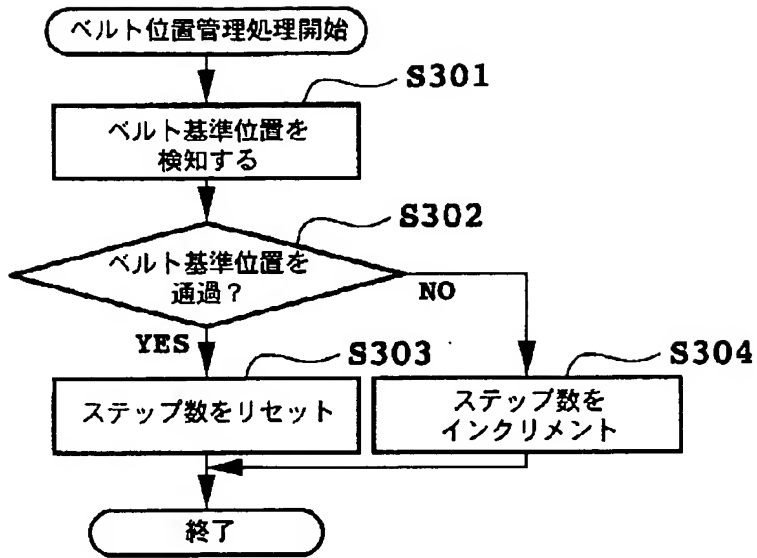
[Drawing 8]

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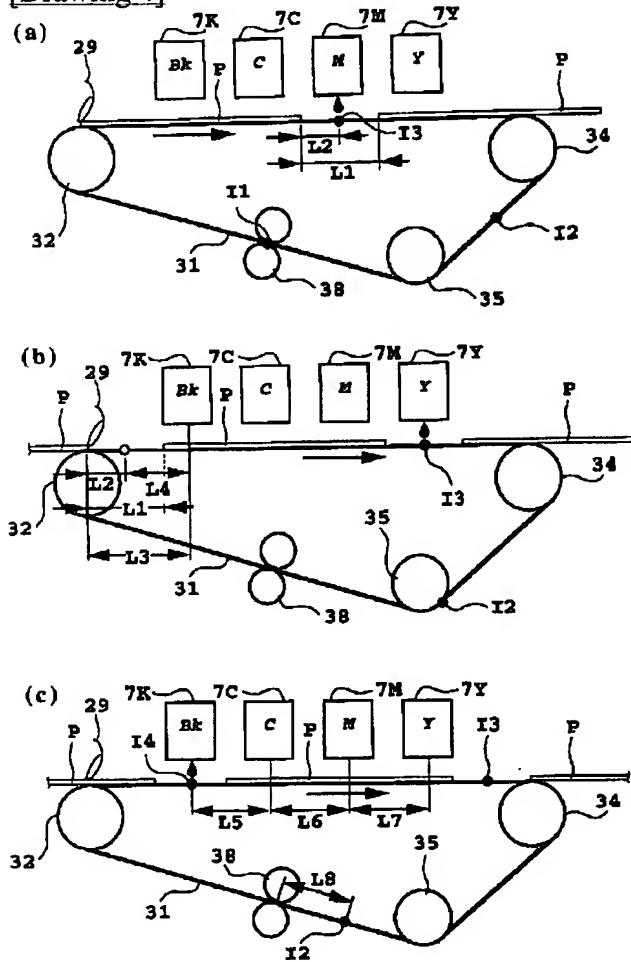
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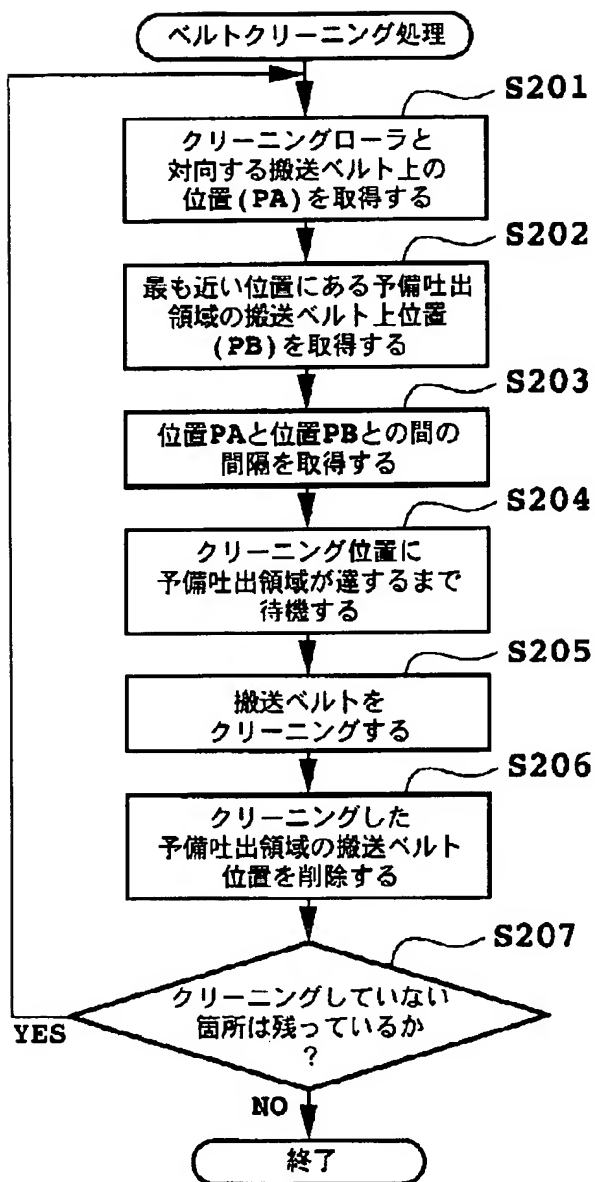
[Drawing 7]



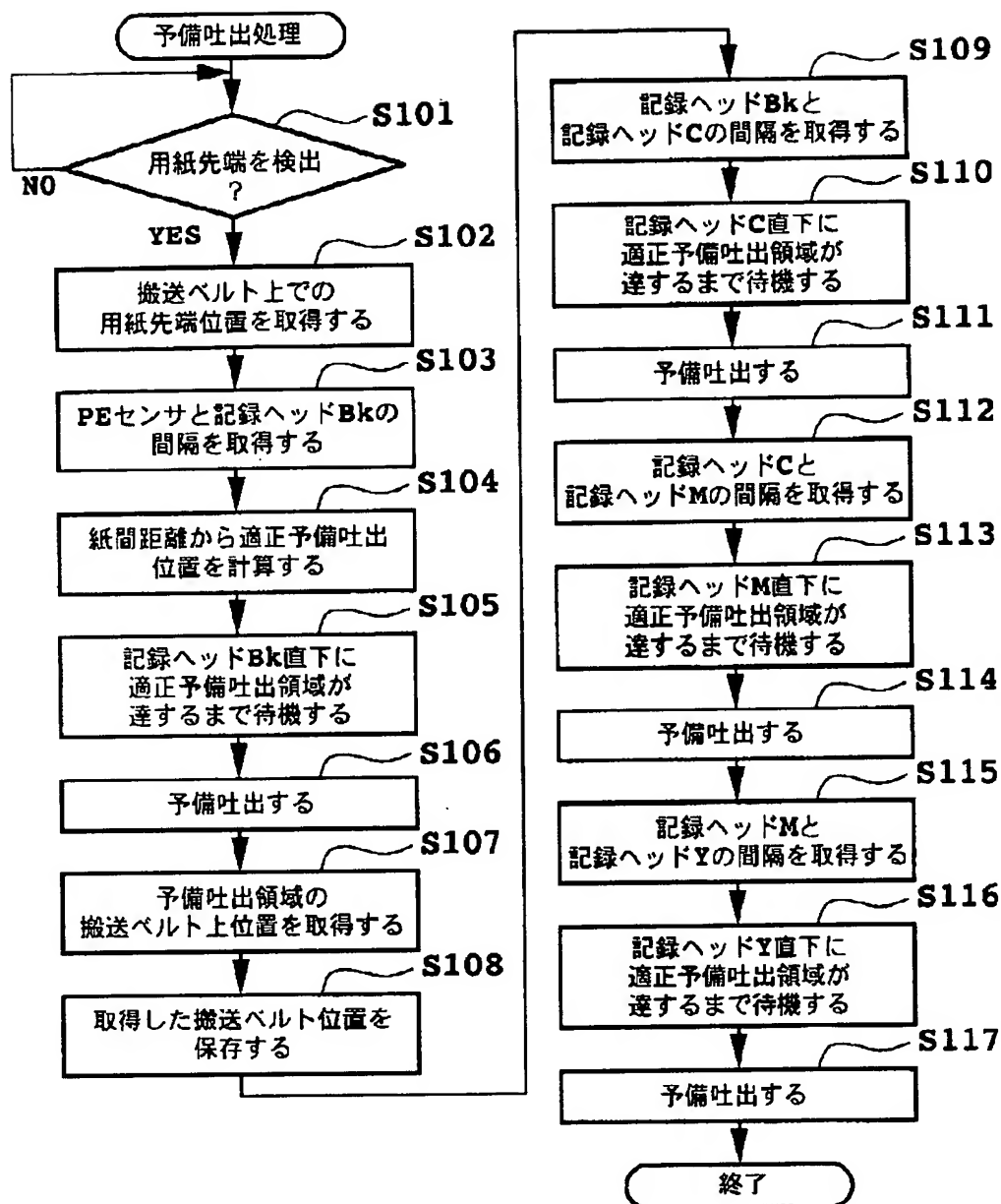
[Drawing 4]



[Drawing 6]



[Drawing 5]



[Translation done.]